Low-Power Radiation Hardened Delay-Insensitive Asynchronous Microcontroller Technology Capable of Operating on Extreme Temperature Environments, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

In this SBIR effort, Arkansas Power Electronics International, Inc. (APEI, Inc.) and the University of Arkansas are partnering to develop a versatile, radiation-hardened, low-power, asynchronous 8051-based microcontroller capable of functioning in a very wide temperature range (-230

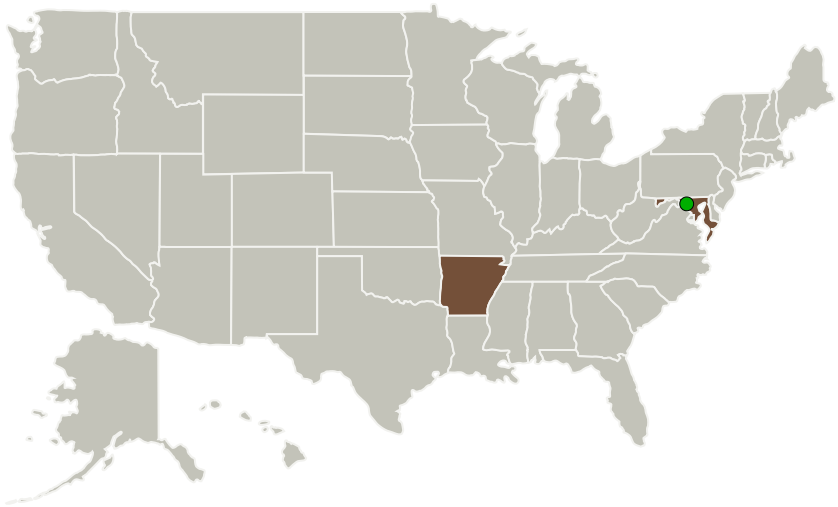
o

C to +150

o

C). To make the asynchronous microcontroller as seamless as possible with existing technology, the proposed asynchronous 8051 microcontroller will be developed to be pin-to-pin compatible with the commercial 8051, as well as compatible with the existing commercial software suites. The 8051 is considered the world's most popular microcontroller core, therefore demonstration of the design methodology on this platform allows for quick adoption ⇔ extensive software libraries, advanced compilers, and well-trained software developers are readily available to support integration.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Arkansas Power Electronics International, Inc.	Lead Organization	Industry	Fayetteville, Arkansas
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Arkansas	Maryland

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138279)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Arkansas Power Electronics International, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Roberto Schupbach

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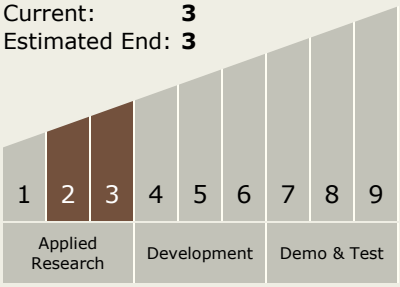
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.3 Collaboration and Interaction
    - TX10.3.4 Operational Trust Building

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System